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THE SEASONS.

"KNOWLEDGE NEVER LEARNED OF SCHOOLS."

Edited by MISS ARMITT.

WILD GERANIUMS.

In May one may find several of the Wild Geraniums in flower, notably those that are garden weeds. The beautiful little shining crane's-bill, *Geranium lucidum*, decorates the stone walls profusely in certain places; its rose-coloured flowers are not its prettiest part, but the bright red stems, with their contrast to the vivid green of the mature leaves; the young plants are often wholly of this shining red, both stem and leaves. It inhabits my garden steps and walls as a weed, where it, indeed, looks well enough to be allowed to remain, did it not take advantage of that privilege, and encroach on the domain of other plants, such as the Ivy-leaved Toadflax, whose presence I much prefer. It flowers early in May, and quickly runs to seed. *Geranium Robertianum* is the Herb Robert of English nomenclature. Robert is, perhaps, a corruption of rob or rub-wort, the red plant, from the tendency of the whole plant, stem and leaves, to ripen into a rich deep red. Though but an annual or biennial, it is a persistent and tiresome garden weed; it hides in the shelter of other plants, and shoots out seeds in all directions. *Geranium dissectum* is another of the too numerous garden weeds that live ever with us and in spite of us, easily uprooted, and yet in the end stronger and more persistent than their uprooters. The damp meadows of May are often beautiful with the large flowers of *Geranium sylvaticum;* in early June comes out *Geranium sanguineum*, often found in the vicinity of the sea, but it is not till later in the month that the largest and handsomest of our wild geraniums, *Geranium pratense*, appears. In May, too, come the dark flowers of the naturalized *G. Phæum*, the dusky crane's-bill. In treating of the genus Geranium, the subject of dispersal of seeds cannot be left untouched on account of the peculiarly vigorous manner which the British species have of bursting their ripe capsules, and scattering the contained seeds. The Greek name, from *geranos*, a crane, was given in allusion to the long-beaked fruit, and it is this long-beaked fruit, or crane's-bill, which marks out *Geraniaceæ* from all other families. To describe this characterizing fruit, one must begin with its origin in the flower. The outermost floral covering is made up of five ribbed sepals; they are persistent, and when the petals have fallen they close up again round the central organs, completely enclosing and protecting the young fruit, and so remain till it is ripe, when they fall back again to allow its escape. The petals are five, richly streaked or laced with coloured veins, consisting almost entirely of air vessels. The stamens are ten, in two whorls, of which the outer are often shorter than the inner. The filaments, like the sepals, are very persistent; their wide bases are to be found still round the mature carpels, but the anthers are fugacious, and fall off early. The central organ, the pistil, lying above and in the midst of the stamens and petals, is the peculiar feature of the flower; it is made up of five carpels, surrounding an axis, which is the disk or receptacle of the entire flower, prolonged upwards through their centre. In each of the five cells of the ovary may be one or two seeds, according to the species; the styles adhere to form a column, divided at the top into five lobes, which bear on their inner surfaces the stigmas. After the ovules are fertilized the central axis continues to grow, and lengthens out into the long beak. The seeds are arranged round the base, and the styles form the sides of the elongated column, and grow with it. In most other flowers the styles wither away after fertilization, and by the time the fruit is ripe have entirely disappeared, but in the genus Geranium the styles continue to grow and harden as a part of the fruit. When the whole is ripe the seeds are sown in a curious manner. The styles shorten in drying, while adhering so closely at their top points that they cannot separate at that place, hence the carpels must break away from their attachment at the base, and curve up towards the top of the beak; the seeds in their cavities are exposed, and as the action takes place suddenly they are thrown away to some distance. The mechanism is not quite the same in all species. *Geranium dissectum* keeps its carpels twisted upwards and empty, the seed gone. In *G. Robertianum* each little carpel or seed-case springs away with the seed inside it; it is keeled and wrinkled on the outer surface, and attached to the beak but slightly, only by long silky hairs, easily broken by the force of the action, so that the seed carries its case along with it, and often gets caught, by the silky hairs on some neighbouring plant. Sir John Lubbock had some of these trailing Geraniums placed upon his billiard table in order to watch the process of seed dispersal, and found that the distance the seeds were thrown by the contracting jerk was more than twenty feet. In the shining crane's-bill, *G. lucidum*, the wrinkled carpels loosen first below, as, indeed, do the others, but they break away at the top of the rounded seed-vessel, and tear away none of the central column, not even as much as the two silky hairs of Herb Robert, and the long beak is left in this case standing entire. The larger Geraniums, with wide-spreading petals that attract the insect-world, are all more or less adapted to ensure cross-fertilization. The flowers of *G. pratense* are completely proterandrous, so much so that there is no possibility of self-fertilization. The large bright blossoms draw many insect visitors, who involuntarily carry the pollen from one plant to another. The honey is secreted by five glands at the base of the outer stamens. Each flower passes through three distinct stages; at first the style is not fully grown up, and the stigmatic surfaces are invisible and unfolded. First, the five outer stamens erect themselves and uncover their pollen; as these wither the five others in turn raise themselves, ripen, and spread out their contents in the centre of the flower; so far the flower has been entirely male. Lastly, when all the anthers are withered and dropped from their filaments, the summit of the pistil opens and reveals five inner stigmatic surfaces, which now roll themselves back in the position before occupied by anthers. The order of events is more clearly portrayed in *G. sylvaticum*. These flowers are proterandrous, too, though in a less complete degree than the larger ones of *G. pratense*; their pistils are further developed when the petals first unfold, and are, perhaps, mature with the second set of anthers. The two species may be compared thus :—

	1st Stage.	*2nd Stage.*	*3rd Stage.*
G. pratense	5 anthers open	5 anthers open	5 stigmas mature
G. sylvaticum	5 anthers open	5 anthers open and 5 stigmas ripe	5 stigmas mature

Thus, in the latter self-fertilization is not impossible, but unlikely. *G. sanguineum* resembles *G. sylvaticum* in its floral process, with some variation. First, five anthers are erect and open, then five others join them, and a circle of ten stands in the centre of the flower. Lastly, the stigmas mature, and being on the same level with the anthers still pollen-laden, may easily become fertilized by them, should other supplies fail. When we take up the small weedy Crane's-bills we find their floral arrangements not so well marked out in periods, the different stages of maturity of the reproductive organs much less, if at all conspicuous. Without the means of attracting large insects, these little flowers must contrive by self-fertilization to do without them. *G. Robertianum* is frequented by small flies, which creep in and out, and dust themselves and all parts of the flower alike with pollen. When the petals unfold the stigmas are closed, and five anthers stand erect, covered with pollen, while five others lie back upon the petals unopened; next the stigmas separate and expand; as the first open anthers wither the others rise and open, also surrounding the stigmas. Later, when the first anthers are quite over and gone, the extended stigmas rise a little, and stand above the remaining pollen-covered anthers. In this flower, therefore, cross-fertilization may take place, but if not, self-fertilization seems to be sure. My last instance, *G. dissectum*, reverses the proceedings of the others. When the flower opens the anthers are closed, and the stigmas are already widely outspread. The flower in its first stage is female only; later on the anthers, opening, spread the pollen on the stigmas, which they closely surround. Later, again, when the anthers have withered and gone, the stigmas stand alone, and the last stage is identical with the first, and *G. dissectum*, in spite of its different beginning, ends as do so many others of its genus.

S. ARMITT.

NATURE NOTES: ARRIVALS.

The month from the second week in April to the second in May is the most interesting time of the year to the ornithologist. Each day is full of expectancy, of arrivals, of surprises. That space of time, with a supplementary week added to each end of it, covers the whole of the arrivals of the summer migrants from over sea. Horde after horde they come; multitudes of each species, and as many as 22 or 23 different species. They swarm over the land and fill it with song, just as the vernal green is dazzling the eye with its newness, and the flowers spring. They out-number our few home species, overwhelm them, till these are practically lost in the crowd. What a world it seems suddenly of sunshine, of flowers, of budding leaf, of insects, of singing birds! All at once they come; and that not by accident. They are in fact bound up together. Born of the sunshine and the warmth are first the insects and the flowers. Even these have a mutual dependence. The busy little bee that creeps now at eve into its tunnel in the soil, has been finding food for its coming grubs in the blossoms all day. The barren strawberry that opens on sunny rock, April 23rd (a favoured spot; where the tiny moonwort fern already is starting, and large wood ants and spiders race about, and beetles crawl, and in the adjacent lake margin, the myriad minnows dart in close shoals or leap into sunlight) has its white blossoms visited by one particular species of green-bodied fly, one fly on each flower. A thousand forms of insect life are wakened, or are born, in this first spring warmth. The air is full of them; the ground is crowded; the new leaves, too, rapidly acquire their parasites. Sit down a moment, and pin-point red spiders will run on one's page, and a rove beetle (*oxypoda luteipennis*) will alight there. On delicate tall wings it sails, till it settles. Then watch it! Those translucent wings have to be folded and doubled within such short square wing-cases, as makes the task far more complicated than the house-wife's adjustment of linen within her press. The beetle turns its tail over, to assist in the folding, and neatly tucks them in; then the little black shutters of electra are closed upon them, and we see only a slim black creature, very active on its feet, and seemingly innocent of pinions.

It is this wealth of insect life that brings the winter-banished birds suddenly back to us. They are as inevitable as the summer. They come just as soon as the resurrection of life takes place here. Nothing delays them, except a few cold days at the time of their start. The frost and snows of February that left lingering patches of white on the Rydale slopes of Fairfield for the May sun to melt, affected the bird arrivals scarce at all. Some species, indeed, in comparison with last year's dates, show a week or ten days delay, and these were the earlier ones; but others again came as soon or sooner. In fact, after the rains of April 25th, 26th and 27th, and the sunshine that followed, the season overtook itself. While early blooms, such as wych-elm and the tiny *Adoxa moschatellina* were quite a month or five weeks later than last year, later ones, like the beautiful heckberry of our hedgerows, were not more than ten days behind; and the pushing bluebells are now fully up to date. And birds pressed in, though not before their insect food was flying, before, at any rate, their appropriate herbage was ready. The Wood-warbler's favourite oak was bare when he came. On April 30th (when the budding thorn hedge smelt pungent after rain, and Treepipit sang against his neighbour in such ecstasy that he could scarce spare time to drop to the ground for his lunch, and Hen-redstart about the shadowed wall picked moss for her nest) he was trilling his labiate speech in a silver-birch that was just shaking out a soft sheeny gown over its delicate limbs. The Corn-crake arrived at his home hedge-backing when the meadow beside it, whose tall grasses have to hide his nest and to supply him with food, was just rolled by the farmer as flat as a pancake. I watched him (May 5th; he had been heard on April 28th, I am told) make feeding excursions on to its roller-striped surface, dotted then with golden dandelions. He was as apparent as the Starlings that fed there too, and once lifted up that extraordinary voice of his in the open, which, however, he generally waits to do until he is within the covert of the hedge. The Whinchat, too, that is largely dependent on our hay-fields for food, was wirily singing in the thorns by May 3rd. On April 30th the White-throat was here, showing its grey pate, though it was not till several days later that it begun to flounce out of the bushes in mad song, imitating the Sedge-warbler that piped by the runnel, and visiting the fruit garden, where already the purple patches on currant leaf betrayed where the aphides were feeding on its juices. The Pied-flycatcher seemed content, on May 6th, to sing and catch flies in the barest of ash-boughs, whose open flower-bunches serve perhaps as an insect decoy, since a pair of Blue-tits (whose nest is in the very next pollard tree) as well as a Chaffinch found, a few days earlier, a well-stocked larder within them. The Pied's spotted cousin, one of the last of the migrants to come, was found about his old haunts of ivy-clad house and stable-corner on the 9th, and from that day on his weak voice told his pleasure, and the curve of his grey wing showed where he hunted from the bough. As for the Swallow tribe, its several species and thousand members have been dropping in all through the time of migration. Very interesting to note is the occasional immigration of the little Sand-martin (usually the first to arrive) into these parts, whence, however, it is almost invariably bound to retreat for want of nesting ground. On the evening of April 24th, when black thunder-clouds gathered, and the Redstart took his supper in the live fence, where the bird-cherry budded, eleven little brown white-breasted birds shot over the low road hedge that flanks Rothay Bridge and scurried in a compact body down river. Never was flurry and retreat more apparent in bird-forms than in these Bank-swallows. 'Twas as if they said, "For goodness sake! come back! A horrid land that, higher up about the Rothay water! Won't do at all. Not a friendly mud-slope or sand-bank anywhere; nothing but dreadful rock and and mountain! though Rydal mere *might* have done otherwise!" So back by river-path they went (and why does their motion always suggest air-swimming fishes?) the growling thunder adding to their discomfiture, no doubt; and were no more seen. Odd appearances of the Barn-swallow were recorded April 13th, 16th and 19th, though it was not till the 22nd and onward that its settlement on its home-barns and outhouses actually began. The first House-martins, not in a passing band, were seen wheeling at ease on the 22nd; but it was not till the 28th that a few odd birds established themselves in the neighbourhood of Ambleside; and after that they dropped in gradually. The inhabitants on one house-nest were seen to visit their premises on April 30th, another on May 2nd, another on May 5th, and so on. The pairs exhibit the liveliest joy on arrival; one getting within the nest, the mate clinging outside and bubbling over with affectionate chatter. Then both will get into the tiny place, and remain for a while, before they shoot out, and skim the air again. This happy scene, continued for some days about one domicile, very much irritated a House-sparrow, living on the roof. He decided to secure that commodious dry little residence for himself. He flew to it, grappled its rough wall with his feet, and tried to screw himself inside it. In vain! The aperture was too small for his big body. Again and again he tried. Then, determined that the builders should not have it, if he could not, he pulled out the feathers they had gathered (he could screw his head far enough in for that), and flung them to the wind; and then mounting guard on the gutter above, sang a mighty war-song of defiance. I am glad to say the gentle little architects, retreating for a day or two, gained the field finally by patience, and are now happily commencing domestic life within the walls. Swifts, that feed on the highest stratum of insects, first settled about Ambleside on May 5th,—though sighted by one observer so early as April 27th. There were then but three of them, and it was not till the 11th that an accession of from 12 to 16 fresh comers made the bright morning merry with screams. On that glorious evening, before the weather broke, the adder was seen, below the orchid-clad meadow (*Orchis mascula*). The stone fly (probably *Perla bicaudata*) buzzed radiant in sunlight, and then crawled a slow, dark object on wall, making ready for the time that it should creep below water, to deposit its eggs and finish its own life. An allied species, with long tips to the body (*Perla marginata*), clung to the flowering stems of the water-sedge (*Carex vulgaris*). The Sandpipers shot, a coupled pair, above the blue lake water, or rested on rock; while two Pied-flycatchers answered one another in lazy and indifferent song. M. L. A.